

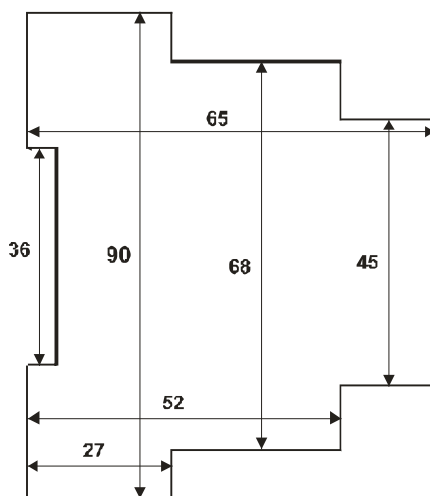
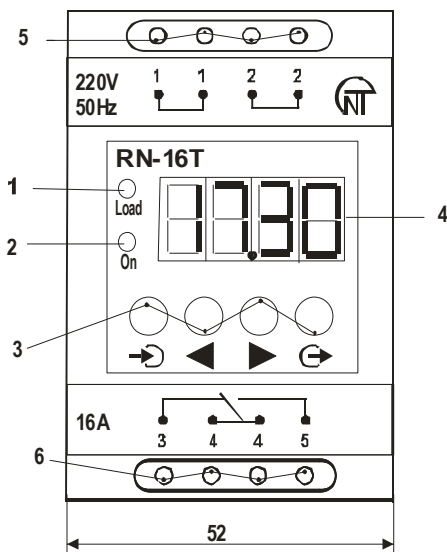


**NOVATEK Ltd**  
**Research-and-Production Company**



# **TECHNICAL DESCRIPTION AND SERVICE MANUAL RN-16T**

## **DAILY-WEEKLY TIMER WITH VOLTAGE RELAY**



- 1 – red LED signal for load is on;  
2 – green LED “ON”;  
3 – menu control buttons: →) – entry into menu, parameter input;  
(→ – menu exit; ◀▶ – scrolling.  
4 – seven-segment indicator (display);  
5, 6 –connection contacts.

**SAINT-PETERSBURG**

## APPLICATIONS

The RN-16T daily-weekly timer with the **mains voltage monitoring option** is a microprocessor electronic device that functions as a voltage relay and a real time relay. The RN-16T is designed for:

- load energization/de-energization according to user-specified reset time /trip time;
- de-energization an industrial and appliance single-phase 220V/50Hz load when there are unallowable voltage variations in the mains. When the mains parameters return to normal, the RN-16T automatically re-energizes the load.

The maximum number of events that the timer provides is:  $60 = 30 \text{ ONs} + 30 \text{ OFFs}$ .

### 4 modes of operation:

- I. **A** – identical events for all days of week;
- II. **1-7** – different events for all days of week;
- III. **b** -- identical events for 5 working days;
- IV. **C** – identical events for 2 weekends of week.

The maximum number of events

in the A mode of operation:  $7 \times 60 = 420$ ;

in the 1-7 mode of operation:  $30 + 30 = 60$ ;

in the b –C modes of operations:  $5 \times N + 2 \times M$ , where  $N + M = 60$ , number of events in the working days and weekends (for instance, if number of events in the working days is  $N=40$  and number of events in weekends is  $M=20$  the maximum number of events is  $5 \times 40 + 2 \times 20 = 240$ ).

The RN-16T switches any power load:

- When the load power is below 3,5 kW (16A, AC1) de-energization is performed directly through the relay output contacts that are connected in series with the load power supply;
- When the load power is above 3,5 kW (16A) de-energization is effected by the magnetic starter of the corresponding power (MS is not supplied in the complete set) that has the relay output contacts to be connected in series with its coil power supply.

## DESCRIPTION

The timer is connected to the mains of 220V A.C. by the input **(1-1) – (2-2)** contacts. The input contacts are provided with twin terminals for ease of wiring, i.e. **the 1-1 terminals is the first connection point and the 2-2 terminals is the second connection point**. The timer has the group of two-way break-before-make output **3–4-4–5** contacts with a common **4-4** point. The load is connected through the **4-5** contacts that break the load power supply circuit or the magnetic starter coil power supply circuit. The **3-4** contacts are used in control & alarm circuits, if necessary.

The setting of the real time, trip time and reset time, modes of operation according to days of week as well as trip thresholds for voltage levels is effected by

the buttons «◀▶, →), (→ » (see the section «**Preliminary starting procedure and service manual**»).

When the relay trips for overvoltage/ undervoltage, the load is de-energized by the **break of 4-5 N. C. contacts** that disconnect either the load power supply directly or the magnetic starter coil power supply. The load will be automatically re-energized on return to normal conditions when voltage parameters regenerate.

**The 3-4-5 output contacts specification**

	Max.current under U~250V A.C.	Max. power when contacts are closed	Max. switch. power	Max. long-term safe voltage A.C./D.C.	Max. current under U=30V D.C.
Cosφ=0.4	5A	5000VA	4000VA	380/150 V	5A
Cosφ=1.0	16A				

**Note:** Load de-energization for poor quality of the mains voltage doesn't change the time program mode of operation. Load energization occurs after the voltage parameters have returned to normal considering the occurred event in accord with the time program. If the mains voltage has been removed the parameter setting will remain the same for not less than one month. At that the output contacts return to the initial position corresponding to dead relay.

*For instance, the timer is programmed for all days of week so that the last energization occurs every day at 22.00 p.m., and the following de-energization occurs next day at 08.00 a.m. Let's assume that the voltage was removed on Monday at 22.30 p.m. (the timer was in the load energization mode of operation) and was applied on Wednesday at 06.00 a. m. At that after the voltage has been removed the 4-5 contacts open and the 3-4 contacts close. According to the last program instruction after the voltage has been applied the load is energized and will be de-energized at 08.00 a.m.. If some other algorithm of energizations/de-energizations is selected for Wednesday then the timer output contacts take the position corresponding to the last instruction when the voltage existed and they will remain that position as long as the nearest time instruction for Wednesday will be executed.*

**Preliminary starting procedure and service manual**

Preliminary starting procedure offers such option as programming of real time for a day of week and time of natural day, reset/trip time considering the day of week, trip thresholds for overvoltage/undervoltage.

To apply a voltage to the timer means to connect the «1-1 – 2-2» input terminals to the mains supply. Connection to the mains supply is effected according to the safety regulations on dead timer. User must perform the operations as follows:

Step s	Operations	Button	Menu point	Actions
Real time setting				Day of week (1-7); time of natural day (00-24h, 00-59 min).

1	Menu entry	→)	E0.1.A	Find ◀▶ CLOC
2	Current day of week setting	→)	daY.1	Blinking digit of days 1-7 Set ◀▶
3	Current hour setting	→)	00.00	Blinking digit of tens of hours 0-2 Set ◀▶
4	Current hour setting	→)	00.00	Blinking digit of hour units 0-9 Set ◀▶
5	Current minute setting	→)	00.00	Blinking digit of tens of minutes 0-5 Set ◀▶
6	Current minute setting	→)	00.00	Blinking digit of minute units 0-9 Set ◀▶
7	Menu exit	*(→	23.47	The time is set (see the example)
<b>Voltage trip thresholds setting **</b>				Lower threshold 150-210 V Upper threshold 230-290 V
8	Menu entry	→)	Any	Find ◀▶ L_ _ _ - lower threshold (instead of _ _ _ can be 150-210)
9	Lower threshold setting	→)	L150-210	Blinking point under pod L Set ◀▶
10	Menu exit	(→	L200	Lower threshold is set (see the example)
11	Menu entry	→)	Any	Find ◀▶ H_ _ _ - Upper threshold (instead of _ _ _ can be 230-290)
12	Upper threshold setting	→)	H230-290	Blinking point under H Set ◀▶
13	Menu exit	(→	H250	Upper threshold is set (see the example)
<b>Time operation modes setting **</b>				Operation modes: A, 1-7, b+C
14	Menu entry	→)	Any	Find ◀▶ E01 – first energization time
15	Mode selection	→)	dAY.A	Blinking letter A (1-7, or b, C), select ◀▶
16	First energization time setting	→)	05.30	Set ◀▶ first energization time according to the 3-7 steps( see the example), (→
17	First de-energization time setting	→)	Any	Find ◀▶ d01 – first de-energization time
18	Mode selection	→)	dAY.A	Blinking letter A (1-7, or b, C), select ◀▶

19	First de-energization time setting	→)	09.15	Set ◀▶ first de-energization time in accord with the 3-7 steps (see the example), (→
20	Menu entry	→)	Any	Find ◀▶ E02 – second energization time
21	Mode selection	→)	dAY.A	Blinking letter A (1-7, or B, C), select ◀▶
22	Second energization time setting	→)	11.00	Set ◀▶ second energization time in accord with the 3-7 steps(see the example), (→
23	Second de-energization time setting	→)	Any	Find ◀▶ d02 – second de-energization time
24	Mode selection	→)	dAY.A	Blinking letter A (1-7, or B, C), select ◀▶
25	Second de-energization time setting	→)	12.00	Set ◀▶ second de-energization time in accord with the 3-7 steps (see the example), (→
26	Subsequent energization/de-energization time setting	→)	Any	Set ◀▶ subsequent energizations/de-energizations time according to the 15-19 steps

\* \* – To set the time one needs to make the resetting for seconds (to fill seconds with zero), that's why the →) button is pressed at zero seconds.

\*\* – If voltage monitoring or time operation modes specification is not required they are not set; parameter reset is effected by the label «\_» input into any point of instruction.

If necessary, operation modes can combine in different conjunctions. The only limitation is that number of events must not exceed 60.

For the timer programming convenience you must make a scheme of work of your load. To this effect use the table below:

№ of event	№ of energization	Energization	№ of de-energization	De-energization

Filling of this table for a conditional load is shown below:

№ of event	№ of energization	Energization	№ of de-energization	De-energization	Note
1	1	First			Identical

		energization time for all days of week 01.A=06.00			energizations for all days of week
2			1	First de-energization time is on Monday d01.1=06.15	Different de-energizations for three days of week
3			2	First de-energization time is on Tuesday d02.2=06.20	
4			3	First de-energization time is on Wednesday d03.3=07.00	
5			4	First de-energization time is on Thursday and for the rest of days of week d04.A=07.15	Identical de-energizations for all days of week
6	2	Second energization time for all working days of week E02.b=08.00			
7			5	Second de-energization time for all working days d05.b=09.00	Identical de-energizations for all working days
8	3	Second energization time for weekends E03.C=09.00			Identical energizations for weekends
			6	Second de-energization time for weekends d06.C=10.00	Identical de-energizations for weekends

**Remember that number of events can not exceed 60, i. e. 30 energizations and 30 de-energizations. The number of energizations and de-energizations may differ.**

After programming and in the operation user may view all the programmed events. To this effect one needs step-by-step to enter (→) every parameter by menu buttons and to exit from menu ((→) with no parameter changed.

**Note.** To set time values user must specify all digits, «0» included, like that: 07.35 a.m. is to be set as «07.35», 07.35 p.m. is to be set as «19.35». Unspecified time is

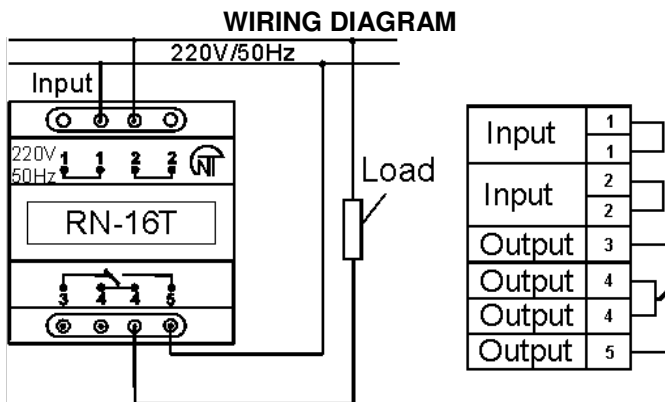
displayed as « \_ \_ \_ \_ ». To delete an instruction one should put at least one space for the instruction time ( \_7.35 – the time is deleted).

**Load connection** must be performed according to the safety regulations when voltage is removed.

The programmed relay display shows the real time. The mains voltage value is shown for 3 sec. every 15 sec.

#### TECHNICAL BRIEF

Nominal supply voltage, V	220
Lower threshold for supply voltage, energizing the relay, V	140
Maximum supply voltage, V	300
Trip setting range for voltage, V: -Lower threshold -Upper threshold	150 – 210 230 – 290
Trip threshold accuracy for voltage, V	1
Voltage measurement accuracy, no more than, V	1
Voltage hysteresis, V	+ 5
Fixed trip delay for overvoltage, no more than, sec	0,5
Fixed trip delay for undervoltage, sec (immunity to minor and/or short-term undervoltage preventing excessive trippings)	12
Time setting hold-in accuracy, no more than, sec	1
Time setting accuracy, no more than, min	1
Maximum number of events in “A” mode of operation for a natural day, including number of: -energizations -de-energizations for a week	60 30 30 60X7=420
Maximum number of events in “1-7” mode of operation for a week, including number of: -energizations -de-energizations	60 30 30
Maximum number of events in “b+C” mode of operation, working days +r weekends, including number of: -energizations -de-energizations	5xN+2xM, where N+M=60 30 30
Endurance (retention of settings when supply voltage is removed, no less than)	1 month
Number and type of contacts (N. O. – normally open, N.C. – normally closed; two-way break-before make contacts)	1 N.C. and 1 N. O.
Protection degree: - the relay - terminal box	IP40 IP20
Output contacts life: -- under load 16A, no less than, operations -- under load 5A, no less than, operations	100 000 1 mln
Power consumption (under load), no more than, VA	3,0
Weight, no more than, kg	0,150
Dimensions, mm	50x88x65
Operating temperature, °C	-10 - +55
Storage temperature, °C	-20 - +70



#### **STORAGE AND SHIPPING CONDITIONS**

The RN-16T in manufacturer package should be stored in enclosed rooms at – 45( -- +75( C and exposed to no more than 80% of relative humidity when there are no fumes in the air that exert a deleterious effect on package and the RN-16T material. The Buyer must provide the protection of the timer against mechanical damages in transit.

#### **WARRANTY**

Novatek company warrants a trouble-free operation of the RN-16T timer manufactured by it within 36 months from the date of sale, provided:

- the proper connection;
- the safety of the inspection quality control department seal;
- the integrity of the case, no traces of an opening, cracks, spalls etc.

Production date \_\_\_\_\_

Serial No \_\_\_\_\_

Quality control department seal \_\_\_\_\_

Sale date \_\_\_\_\_

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